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For $n=72$, $\cos DOE=.99559$, $DOE=5° 29'$, an error of $29'$.

For large values of n the error is much too great for any purpose.

Also solved by *J. E. SANDERS*, Hackney, Ohio.

CALCULUS.

165. Proposed by CAPT. T. C. DICKSON, Ordnance Department, United States Army, Washington, D. C.

Solve by integration the differential equation

$$\frac{d^2\xi}{dt^2}+\frac{A}{B}\left(\frac{d\xi}{dt}\right)^2-\frac{C}{B}=0,$$

in which A, B, C are given functions of ξ, but independent of t.

Solution by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

In view of the nature of the coefficients, we regard ξ as the independent variable and t the dependent, the formulae of transformation being

$$\frac{d\xi}{dt}=1\div\frac{dt}{d\xi},\quad \frac{d^2\xi}{dt^2}=-\frac{d^2t}{d\xi^2}\div\left(\frac{dt}{d\xi}\right)^3.$$

The given equation thus becomes

$$\frac{d^2t}{d\xi^2}-\frac{A}{B}\frac{dt}{d\xi}+\frac{C}{B}\left(\frac{dt}{d\xi}\right)^3=0.$$

Set $dt/d\xi=y$, whence $t=\int y d\xi$. Then $\frac{dy}{d\xi}-\frac{A}{B}y+\frac{C}{B}y^3=0$.

Divide by y^3 and set $z=y^{-2}$. The resulting differential equation

$$\frac{dz}{d\xi}+\frac{2A}{B}z-\frac{2C}{B}=0$$

is linear. By the usual method, we get

$$z=2e^{-\lambda}\left(\int\frac{C}{B}e^{\lambda}\,d\xi+k\right),\quad \lambda\equiv 2\int\frac{A}{B}d\xi.\quad \therefore t=\int z^{-\frac{1}{2}}d\xi.$$

169. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

Find the value of y from the Eulerian equation

$$y=\int\frac{dx}{(x+\sqrt{3})\sqrt[3]{(x^2+1)}}.$$